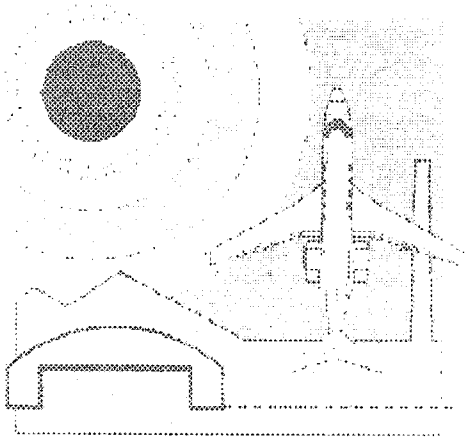
SECTION 4: DEMAND/CAPACITY ANALYSIS



BISBEE-DOUGLAS INTERNATIONAL AIRPORT
Douglas / Cochise County, Arizona

AIRPORT MASTER PLAN - 1997

SECTION 4:
DEMAND/CAPACITY ANALYSIS

AIRPORT SEASONAL USE

Some level of seasonal fluctuation in aircraft operations may be expected at any airport. This fluctuation is most apparent in regions with severe winter weather patterns, at nontowered general aviation airfields. The fluctuation is less pronounced at major airports, with a high percentage of commercial and scheduled airline activity, and also at those facilities with a milder climate and/or a high percentage of training activity.

The southeastern Arizona climate provides a very stable environment for aviation activity. The winter weather is mild and although daytime summer temperatures are typically in the 90's and 100's, the morning and evening hours are usually quite comfortable. Even though the number of operations at BDI is currently quite low, there appears to be a relatively high percentage of training activity at the field.

Instrument conditions in the Bisbee-Douglas area occur less than 3% of the time, according to the weather observers who are based at BDI. Although the present level of activity is light and appears to be quite sporadic, the potential is that a fairly even distribution of seasonal demand will be experienced at BDI after improvements are made.

The probable seasonal use at BDI was modeled by applying the forecast total BDI annual operations to the average seasonal use trend from the 1979-84 FAA records of aircraft operations handled by tower facilities nationally (from the FAA Statistical Handbook of Aviation). This typical seasonal use curve is presented below, and is illustrated on the chart at the end of this Section. For the purposes of comparison, a seasonal use curve which has been developed for non-towered airports with severe winter weather is also presented.

SEASONAL USE TREND CURVES

MONTH	Nontowered w/Severe Winter Weather	FAA Towered Airports
January	3.5%	7.2%
February	4.0%	8.2%
March	4.8%	8.6%
April	7.5%	9.0%
May	11.3%	9.1%
June	13.5%	9.4%
July	14.8%	9.1%
August	13.0%	8.7%
September	10.0%	8.7%
October	8.0%	7.8%
November	5.8%	7.1%
December	3.8%	7.1%

AIRPORT CAPACITY CALCULATIONS

The methodology for computing the relationship between an airport's demand versus its capacity is contained in FAA Advisory Circular AC 150/5060-5, Airport Capacity and Delay.

In order to facilitate this comparison, computations were made to determine the hourly capacity of the existing airport in Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) conditions.

The Annual Service Volume (ASV) of the airport in its ultimate development condition was also determined.

The above determinations were made using the assumptions recommended in the Advisory Circular for the particular airport layout and conditions, combined with the forecast operational data generated with this study. In the following table is a tabulation of the physical aspects of the four aircraft classes (not to be confused with the aircraft approach categories discussed in Section 3), as considered in this Section.

FAA AIRCRAFT CLASSIFICATIONS FOR CAPACITY CONSIDERATIONS

CLASS	Maximum Takeoff Weight	ENGINES
A	12,500 lbs. or less	Single
B	12,500 lbs. or less	MultiEngine
C	12,500 to 300,000 lbs.	MultiEngine
D	over 300,000 lbs.	MultiEngine

Source: AC 150/5060-5, Airport Capacity and Delay.

Runway Capacity - Existing and Ultimate Conditions

The BDI Airport, in its existing configuration, is served by a nonprecision instrument approach and is primarily used by Class A and B aircraft, with about 10% use by Class C aircraft and no use by Class D types.

No airspace limitations which would effect runway use have been identified. In all calculations, it is assumed that arrivals equal departures, and that "touch and go" activity accounts for less than 10% of the total operations.

The existing airport consists of a 7,300' long main runway (17-35) and a 7,000' long paved crosswind runway (8-26), in a "T" crossing configuration.

For the purposes of this study, it was assumed that the airport will remain a two-runway system with a crossing configuration, and that ultimately a full parallel taxiway and an instrument approach to visibility minimums of less than ¾ mile will be installed (an ILS, DGPS or TLS approach).

Using the above criteria and applying them to the Hourly Capacity charts in the Advisory Circular, it is seen that the approximate average peak capacities for the airport in its existing and assumed ultimate configurations are as follows:

Bisbee-Douglas International Airport
HOURLY CAPACITY - OPERATIONS PER HOUR

	VFR	IFR
Existing Condition	59	22
Ultimate Condition	108	60

AIRPORT HOURLY DEMAND CALCULATIONS

In order to arrive at a reasonable estimate of the actual demand upon the airport facilities, it was necessary to develop a method to calculate the estimated Maximum Peak Hourly Demand which might be expected to occur during the hours of peak usage of the airport. The Seasonal Use Trend Curve, as presented above, was used as a tool to determine this usage.

Using the Seasonal Use information, a formula was derived which will calculate the average daily operations in a given month, based on the percentage of the total annual operations for that month, as determined by the curve.

The formula is as follows:

Where	T	=	Monthly percent of use (from curve).
	M	=	Average monthly operations.
	A	=	Total annual operations.
	D	=	Average Daily Operations in a given month.
	M	=	A (T / 100)
	D	=	M / (365 / 12)

Experience has shown that approximately 90% of total daily operations will occur between the hours of 7:00 AM and 7:00 PM (12 hours) at a typical General Aviation airport such as BDI, and that the maximum peak hourly occurrence may be 50% greater than the average of the hourly operations calculated for this time period.

Therefore, the *Estimated Peak Hourly Demand* (P) in a given month was determined by compressing 90% of the Average Daily Operations (D) in a given month into the 12 hour peak use period, reducing that number to an hourly average for the peak use period, and increasing the result by 50%, as follows:

Where D = Average Daily Operations in a given month.
P = Peak Hourly Demand in a given month.
P = 1.5 (0.90D / 12)

The calculations were made for each month assuming both the existing (base) 1997 and the forecast 2016 operation levels, as determined in Section 3 of this report. The results are as follows:

Estimated Hourly Demand / Month
Potential 1997 Activity

Planning Year:	**1997**
Operations:	**25,650**

Month	**% USE**	**Monthly**	**Daily**	**Hourly**
January	7.20	1,847	61	7
February	8.20	2,103	69	8
March	8.60	2,206	73	8
April	9.00	2,309	76	9
May	9.10	2,334	77	9
June	9.40	2,411	79	9
July	9.10	2,334	77	9
August	8.70	2,232	73	8
September	8.70	2,232	73	8
October	7.80	2,001	66	7
November	7.10	1,821	60	7
December	7.10	1,821	60	7

Estimated Hourly Demand / Month
Forecast 2016 Activity

Planning Year:	2016
Operations:	45,556

Month	% USE	Monthly	Daily	Hourly
January	7.20	3,280	108	12
February	8.20	3,736	123	14
March	8.60	3,918	129	15
April	9.00	4,100	135	15
May	9.10	4,146	136	15
June	9.40	4,282	141	16
July	9.10	4,146	136	15
August	8.70	3,963	130	15
September	8.70	3,963	130	15
October	7.80	3,553	117	13
November	7.10	3,234	106	12
December	7.10	3,234	106	12

As is evident in the tables above, the Maximum Peak Hourly Demand in the existing scenario occurs in April through July, with 9 operations per hour. In the ultimate (2016) development time frame, it occurs in June, with 16 operations per hour.

It is important to note that this estimated demand will only occur during VFR weather conditions.

The Maximum Peak Hourly Demand in the existing time frame represents approximately 15% of the estimated Hourly Capacity of the existing and ultimate facility under VFR conditions.

ANNUAL SERVICE VOLUME (ASV)

The Annual Service Volume, or ASV, is a calculated reasonable estimate of an airport's annual capacity, taking into account differences in runway utilization, weather conditions and aircraft mix that would be encountered in a year's time.

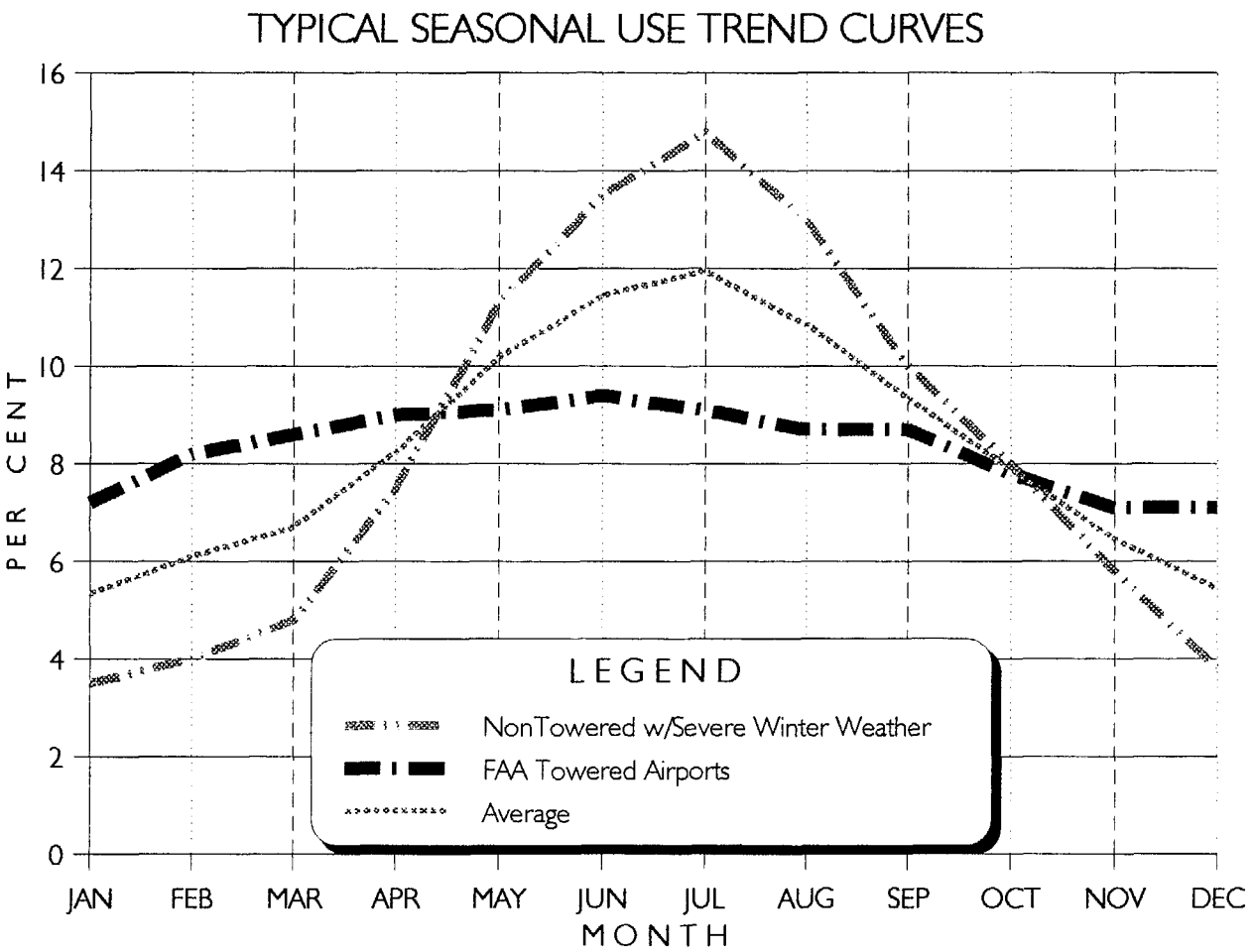
When compared to the forecast or existing operations of an airport, the ASV will give an indication of the adequacy of a facility in relationship to its activity level.

The ASV is determined by reference to the charts contained in FAA Advisory Circular AC 150/5060-5 Airport Capacity and Delay.

The approximate Annual Service Volume for the BDI Airport in its ultimate condition is 230,000 operations/year. It is, therefore, evident that the facility will not exceed its capacity within the time frame of this study, since it will theoretically be functioning at only about 20% of its ASV.

CONCLUSIONS

There are no demand or capacity constraints apparent for the Bisbee-Douglas International Airport, either at the present time or in the future, assuming that improvements are made to the existing airport infrastructure.


TYPICAL SEASONAL USE TREND CURVES
PER CENT
16
14
12
10
8
6
4
2
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTH
LEGEND
NonTowered w/Severe Winter Weather
FAA Towered Airports
Average